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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,437	02/14/2002	Scott Tucker	'032674-142	8727

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EXAMINER

DEB, ANJAN K

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

GA

**Office Action Summary**

Application No.

10/075,437

Applicant(s)

TUCKER, SCOTT

Examiner

Anjan K Deb

Art Unit

2858

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see pages 2-3 of REMARKS, filed 9-29-03, with respect to the rejection(s) of claim(s) 8-11,23 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shimizu et al. (US 5,592,097) and Yoshinaga et al. (US 5,434,717 A).

The indicated allowability of claims 1-7, 12-22 is withdrawn in view of the newly discovered reference(s) to Shimizu et al. (US 5,457,391), and (US 5,592,097). Rejections based on the newly cited reference(s) follow.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1,6-7, 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimizu et al. (US 5,457,391).

Re claims 1,22 Shimizu et al. (US 5,457,391) discloses method and apparatus for detecting short circuit condition in a pair of write head terminals (4,6) producing a write current IW that when passed through inductive head LH assembly coupled to the pair of write head terminals polarizes the inductive head according the direction of write current comprising a first current mirror ( $I_1$ ) that produces a first current proportional to current flowing in first direction into first write head terminal 4, a second current mirror ( $I_2$ ) that produces a second current proportional to current flowing in second direction opposite the first direction into second write head terminal 6 of write driver circuit (Q1, Q2,Q3,Q4), and short circuit detection circuit 12 responsive to first and second current when average value of first current is different from the average value of second current by predetermined amount (column 8 lines 18-68, column 9 lines 1-42)(Fig. 5).

Re claims 6-7, first and second write current flowing into write head required for polarization of write head is inherently disclosed by Shimizu et al., because digital information is represented by selectively polarizing the magnetic field of consecutive areas across the surface of a rotating magnetic disk.

4. Claims 8-9, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimizu et al. (US 5,592,097).

Re claims 8, 23 Shimizu et al. discloses arrangement and method (Fig. 8) for detecting open circuit in a pair of write head terminals (4, 6) producing a write current  $I_W$  that when passed through inductive head LH assembly coupled to the pair of write head terminals polarizes the inductive head according the direction of write current comprising a current mirror (IC15), and open circuit detection device (20) detecting open-circuit condition when magnitude of mirrored write current drops below a predetermined value ( $IC1=IC15=I_W=0$ ) (column 11 lines 4-45).

Re claim 9, Shimizu et al. discloses resistor R11 connected to current mirror (IC15) wherein the resistor R11 converts the mirror current IC15 to voltage VR11 used by open circuit device 20 to detect when magnitude of mirrored write current drops below predetermined value (Fig. 8).

5. Claims 8-11, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshinaga et al. (US 5,434,717 A).

Re claims 8, 23 Yoshinaga et al. discloses arrangement and method (Fig. 2) for detecting open circuit in a pair of write head terminals ( $V_x$ ,  $V_y$ ) producing a write current  $i_H$  that when passed through inductive head 5 assembly coupled to the pair of write head terminals ( $V_x$ ,  $V_y$ ) polarizes the inductive head according the direction of write current comprising a current mirror (Q18, CM) (column 15 lines 45-68), and open circuit detection device (OPC: open circuit detector circuit)(9) detecting open-circuit condition when magnitude of mirrored write current

Art Unit: 2858

drops below a predetermined value (base current of transistor Q18 not supplied from current mirror CM)(see column 15 lines 61-68).

Re claim 9, Yoshinaga et al. discloses resistor R13 connected to current mirror CM (Fig. 2).

Re claims 10-11, Yoshinaga et al. discloses abnormality detection circuit (Fig. 7) comprising comparator circuit (CP) receiving a reference voltage at one terminal and voltage proportional to write current at another terminal (column 16 lines 64-68, column 17 lines 1-53).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,457,391) in view of Pascucci et al. (US 5,276,644).

Re claims 2,13 Shimizu et al. discloses all of the claimed limitations as set forth above except first and second current mirrors comprising two or more individual current mirrors.

Pascucci et al. discloses first and second current sensing circuit each comprising two current mirrors (see claim 18).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Shimizu et al. adding first and second current sensing circuit each comprising two current mirrors disclosed by Pascucci et al. for increasing the level of current produced by current mirror.

7. Claims 3-5, 12, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (US 5,457,391).

Re claims 3-5, 14-16 Shimizu et al. discloses all of the claimed limitations as set forth above except first and second capacitor.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Shimizu et al. adding first and second capacitors for filtering out high frequency components due to noise from output signal for accurately detecting a short circuit condition in write head.

Re claim 12, Shimizu et al. discloses voltage mode write driver (Fig. 5) and circuitry for detecting a short circuit in write head terminals comprising first and second mirror current ( $I_1$ ) ( $I_2$ ) and short circuit detection circuit 12 responsive to first and second current.

Shimizu et al. did not expressly disclose in the embodiment of Fig. 5 circuitry to detect an open circuit condition responsive to third mirror current proportional to write current passing through inductive head under normal condition.

Shimizu et al. discloses in another embodiment (Fig. 8) circuitry to detect an open circuit condition responsive to mirror current IC15 proportional to write current IW passing through inductive head LH under normal condition.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Shimizu et al. by adding circuitry to detect an open circuit condition as disclosed by Shimizu et al. (Fig. 8) to Fig. 5 for write head fault detection including both open and short circuit condition in write head terminals.

Re claims 17-18 first and second write current flowing into write head required for polarization of write head is inherently disclosed by Shimizu et al., because digital information is represented by selectively polarizing the magnetic field of consecutive areas across the surface of a rotating magnetic disk.

Re claims 19-21, Shimizu et al. discloses resistor R11 connected to current mirror (IC15) wherein the resistor R11 converts the mirror current IC15 to voltage VR11 used by comparator (device 20) to detect when magnitude of mirrored write current drops below predetermined value (Fig. 8).

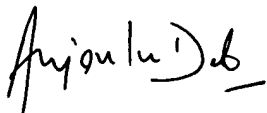


Art Unit: 2858

***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.



**Anjan K. Deb**

Patent Examiner

Art Unit: 2858

11/18/03

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